# DOWNLOAD SYSTEM FOR DOWNLOADING SOFTWARE OR DATA TO TERMINAL

## Background of the Invention

5      Field of the Invention:

The present invention relates to a download system for downloading software or data to a terminal. More specifically, the present invention relates to a download system for downloading software or data to a terminal by remote operation from a center.

10      Description of Prior Art:

Conventionally, a maintenance personnel actually holds a terminal or the like in hand, connects a cable to the terminal, operates the terminal from externally and performs specific operations to the terminal itself so as to rewrite the software of the terminal or the like, changes data thereof or

15   does other things.

However, a PHS (Personal Handy-phone System) terminal or the like provided to collect data on a gasometer or the like emerging in recent years is disposed in the gap between buildings and on the roof of a building. Due to this, it is often difficult to collect the terminal so as to rewrite the

20   software of the terminal or change the data thereof.

## Summary of the Invention

It is an object of the present invention to provide a download system for downloading software or data to a terminal, which system allows

25   rewriting the software or data of the terminal without the need for a user or a maintenance personnel to directly touch the terminal.

According to a first aspect of the present invention, there is provided

a terminal comprising: means for determining whether a received signal is a download start control signal; means for changing a state of the terminal to a download state if the received signal is the download start control signal; means for transmitting a state switching notification signal to a sender of

5    the download start control signal if the state of the terminal is changed to the download state; andmeans for downloading one of software and data after transmitting the state switching notification signal.

According to a second aspect of the present invention, there is provided a center comprising: means for transmitting a download start

10   control signal to a terminal; and means or transmitting one of software and data to be downloaded to the terminal, to the terminal when receiving a state switching notification signal from the terminal.

In the above terminal and above center, each of the download start control signal and the state switching notification signal may be transmitted

15   as one of a sub-address, a push button tone and user-to-user information.

According to a third aspect of the present invention, there is provided a system for downloading one of software and data to a terminal comprising the above terminal and the above center.

20               Brief Description of the Drawings

FIG. 1 is a block diagram showing the constitution of a download system for downloading software or data to a terminal in one embodiment according to the present invention in case the terminal is a radio terminal;

FIG. 2 is a block diagram showing the constitution of the download

25   system for downloading software or data to a terminal in one embodiment according to the present invention in case the terminal is an ISDN terminal;

FIG. 3 is a block diagram showing the constitution of the download

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system for downloading software or data to a terminal in one embodiment according to the present invention in case the terminal is a radio terminal connected to a telemeter;

FIG. 4 is a block diagram showing the constitution of the radio

5 terminal in one embodiment according to the present invention; and

FIG. 5 is a block diagram showing the constitution of the ISDN terminal in one embodiment according to the present invention.

## Detailed Description of the Invention

10 The present invention provides a system for automatically switching the state of a terminal from an ordinary operation state to a downloadable state by transmitting a download start control signal to the terminal in case of changing the software, data or the like of the terminal, which terminal is a mobile radio terminal such as a PHS terminal or an ISDN terminal, or a

15 PHS terminal or the like connected to a telemeter such as a gasometer which emerges in recent years. The software, the data or the like to be downloaded by this system may be a firmware.

The present system is employed by an ordinary constitution using a radio terminal as shown in FIG. 1, a constitution using an ISDN terminal

20 connected to a line as shown in FIG. 2 or the constitution of a PHS terminal connected to a telemeter or the like as shown in FIG. 3.

Referring to FIG. 1, reference symbol 1 denotes a center, 2 denotes a network, 3 denotes a radio base station and 4 denotes a radio terminal. Referring to FIG. 2, reference symbol 1 denotes a center, 2 denotes a

25 network and 7 denotes an ISDN terminal. Referring to FIG. 3, reference symbol 1 denotes a center, 2 denotes a network, 3 denotes a radio base station, 11 denotes a radio terminal and 12 denotes a telemeter.

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FIG. 4 is a block diagram of the terminal 4 as shown in FIG. 1 or the terminal 11 shown in FIG. 3. FIG. 5 is a block diagram of the terminal 7 as shown in FIG. 2. In FIG. 4 or FIG. 5, data as a download start control signal and a state switching end notification signal are registered with a memory 16 of the terminal 4 or 11 . A radio section 13 or a line section 18 receives a signal from the center 1 through the network 2. A control section 14 compares the received signal with signals registered with the memory. If the signal from the center 1 is coincident with the download start control signal registered in advance, the terminal 4, 11 or 7 judges that the signal from the center 1 is a download start control signal. Accordingly, the terminal 4, 11 or 7 starts a software stored in the memory 16 for switching the state of the terminal to a download state.

When switching to the downloadable state is completed, the terminal 4, 11 or 7 reads a state switching end notification signal from the memory 16 and notifies the state switching end notification signal to the center 1 from the radio section 13 or the line section 18 through the network 2. When receiving the state switching end notification signal, the center 1 judges that the state of the terminal 4, 11 or 7 is switched to a download state. Then, the center 1 starts transmitting software or data to the terminal 4, 11 or 7. The terminal 4, 11 or 7 downloads the software or the data transmitted from the center 1 and stores the software or the data in the memory 16.

As one concrete embodiment, there is a method in which a download start control signal and a state switching end notification signal are set as sub-addresses. The sub-address means herein a signal representing additional information transmitted together with telephone number information. The terminal 4, 11 or 7 registers a sub-address "000" as the

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download start control signal and a sub-address "999" as the state switching

end notification signal in the memory 16.　To execute downloading, the

center 1 calls a terminal 4, 11 or 7 through the network 2 and transmits the

sub-address "000" to the terminal 4, 11 or 7.　The terminal 4, 11 or 7

5　receives the sub-address "000" at radio section 13 or the line section 18.

The control section 14 compares the received sub-address with the

sub-address registered with the memory in advance.　As a result of the

comparison, since the received sub-address "000" is coincident with the

download start control sub-address "000", the terminal 4, 11 or 7 judges that

10　the sub-address transmitted from the center 1 is a request to switch the

state of the terminal to the download state.　Next, the terminal 4, 11 or 7

starts a software for switching the state of the terminal to the download

state from the memory 16.　As soon as the switching of the state is

completed, the terminal 4, 11 or 7 calls the center 1, reads the sub-address

15　"999" indicating state switching completion from the memory 17 and

transmits the sub-address "999" thus read to the center 1.　When receiving

the sub-address "999", the center 1 judges that the terminal 4, 11 or 7 is

completed with switch to the download state, and starts transmitting

software or data to the terminal 4, 11 or 7.　The terminal 4, 11 or 7

20　downloads the software or the data transmitted from the center 1 and stores

the software or the data in the memory 16.

In the above-stated embodiment, the sub-addresses are the

download start control signal and the state switching end notification signal,

respectively.　Alternatively, a PB (Push Button) tone, UUI (User-to user

25　Information) or the like may be used as a download start control signal and

a state switching end notification signal.　The PB tone means herein the

tone of the button, which has been depressed, of the terminal.　The UUI

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means herein a function for exchanging short messages of 128 octets (bytes) or less between users using an ISDN D channel.

According to the present invention, by transmitting the download control signal to the terminal, the ordinary operation state of the terminal can be automatically switched to the downloadable state, and software, data or the like can be automatically downloaded to the terminal. In addition, by employing radio and a line, the center responsible for the maintenance of the terminal can collectively rewrite the software and change the data. This makes it possible to rewrite the software or the data of the terminal without taking the trouble to collect terminals piece by piece.